Types of Machine Learning Algorithms

- **Supervised Learning**
- **Unsupervised Learning**
- **Reinforcement Learning**

Supervised Learning

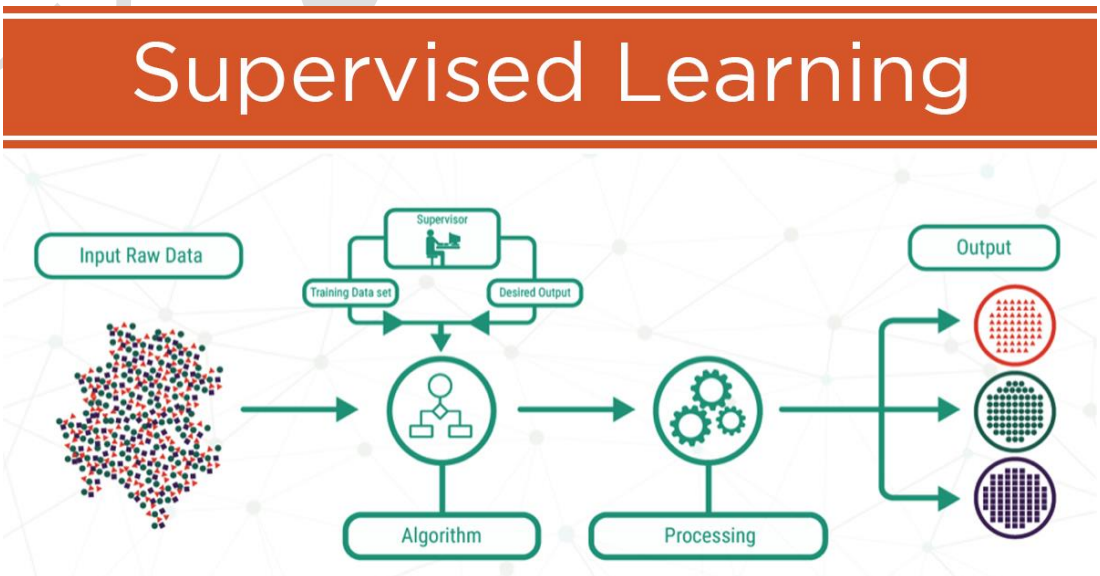
Supervised learning is a type of machine learning where the algorithm is trained on a labelled dataset, consisting of input-output pairs. Each input data point is associated with a corresponding target output. The goal is to learn a mapping function from input to output by minimizing a loss or error. During training, the model adjusts its parameters iteratively through optimization algorithms. The trained model can make predictions or classify new, unseen data based on the learned patterns from the training dataset.

Explanation:

- In supervised learning there is someone called Supervisor who teaches model. Supervisor has an ideal answer for the provided input data.
- Supervisor teaches the model and model learns from supervisor. Both are connected to environment.
- Analysing provided data, model generates output & generated output is compared with ideal output.
- Model learns from the errors and improves the accuracy.

Examples:-

Linear regression, Logistic Regression, Decision trees etc.



Unsupervised Learning

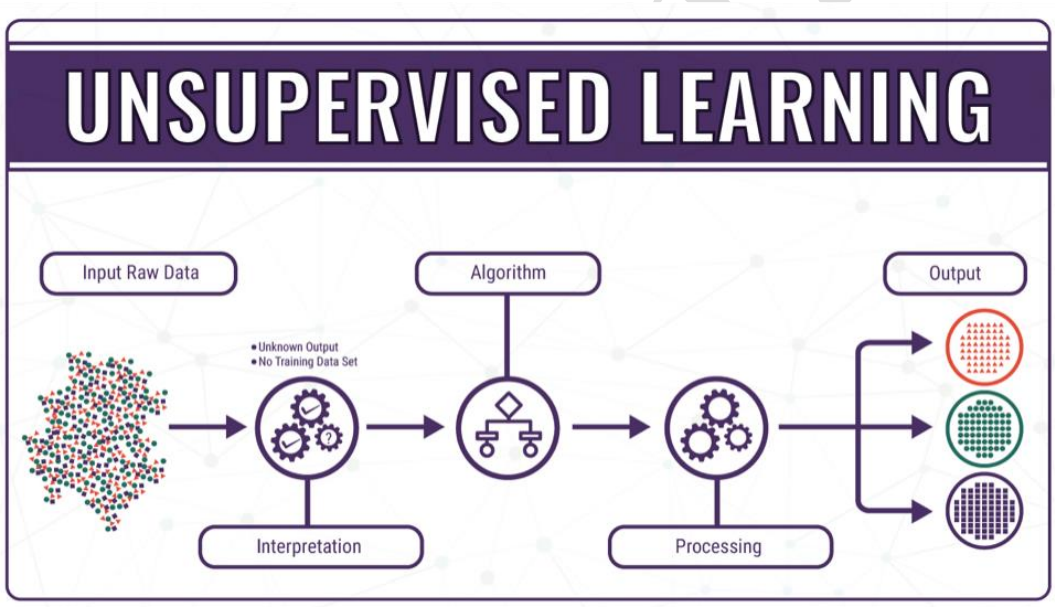
Unlike supervised learning, there is no external supervisor providing ideal answers or labels for the input data. Unsupervised learning is a branch of machine learning where algorithms are trained on unlabelled data, without any predefined target output. The algorithm explores the structure or patterns within the data to infer its characteristics or properties.

Explanation:

- Here is no supervisor to teach the model, so there is no ideal output for the model. Hence model accepts the data, based on characteristics model classifies into particular group.
- In Unsupervised Learning model cannot identify meaning but classify in clusters based on features.

Examples:

K-Means Clustering, Hierarchical Mean, DBSCAN etc.



Reinforcement Learning

Reinforcement Learning (RL) is a type of machine learning paradigm where an agent learns to make decisions by interacting with an environment. Unlike supervised learning, where the algorithm is trained on labelled data, and unsupervised learning, where the algorithm uncovers patterns in unlabelled data, reinforcement learning relies on feedback from the environment through a system of rewards and punishments.

Explanation:

- Reinforcement Learning is reward and penalty based learning. Model gets reward for every right decision and penalize for wrong one.
- In reinforcement learning, the computer learns by trial and error.
- It tries different actions in a given situation and receives feedback (rewards or penalties) based on those actions.
- Over time, it figures out which actions lead to the best rewards and learns to make better decisions to maximize its total reward.